IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant	:	Peter E. Page, et al.
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Title	:	METHOD AND APPARATUS OF SUSPENDING, COMPLETING, AND WORKING OVER A WELL

AMENDED APPEAL BRIEF

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Amended Appeal Brief is filed in response to the Notice of Non-Compliant Appeal Brief mailed December 10, 2007.

In this Notice, the Examiner requires a more detailed "mapping" of the claim limitations to the specification by paragraph number, page and line number or drawing reference characters. The "Summary of the Claimed Subject Matter" has been revised to comply with the Examiner's requirements.

The Examiner has further asserted that the Applicants have not shown good and sufficient reasons why the 37 C.F.R. §1.132 Declaration filed on April 2, 2007 (with an After-Final response) was necessary and was not earlier presented. Applicants respectfully disagree with the Examiner and submit that a proper showing as required by 37 C.F.R. §1.116(e) has already been made. In the Interview Summary mailed May 29, 2007, the Examiner states that this Declaration would be entered for purposes of appeal, clearly showing that the Examiner (at least as of the date of the Interview Summary) was of the opinion that good and sufficient reasons had already been provided as to why this Declaration is necessary and was not previously submitted.

However, in an effort to comply with this requirement by the Examiner, Applicants now

provide an express statement as to why the 37 C.F.R. §1.132 Declaration filed on April 2, 2007 was necessary and was not earlier presented. This express statement is provided in "Status of Amendments" section of this Amended Appeal Brief.

It is respectfully submitted that this Amended Appeal Brief complies with the provisions of 37 C.F.R. §41.37.

Applicants hereby petition for any extension of time that may be required to maintain the pendency of this case, and any required fee for such extension is to be charged to Deposit Account No. 05-0460.

TABLE OF CONTENTS

1. Real Party In Interest

The real party in interest is Woodside Energy Limited, the assignee of the entire title and interest in and to the subject application by virtue of an assignment recorded at the U.S. Patent and Trademark Office at Reel 014968, Frame 0771.

2. Related Appeals and Interferences

There are no related Appeals or Interferences.

3. Status of Claims

Claims 92-106 are on appeal and stand rejected under 35 U.S.C. §103(a). Claims 1-91 have been canceled. A complete copy of the current claims appears in the attached Appendix.

4. Status of Amendments

A Response to a final Office Action was filed on April 2, 2007. No amendments to the claims were made in this Response. However, a Declaration under 37 C.F.R. §1.132 was submitted with this Response. This Declaration has been provided as evidence in support of arguments traversing new rejections of the claims in the final Office Action mailed January 31, 2007. In particular, the claims were rejected in a previous Office Action under 35 U.S.C. §102(b) as being anticipated by certain references, while the claim rejections were revised such that all of the claims now stand rejected under 35 U.S.C. §103(a) as being obvious over a combination of such references. The 37 C.F.R. §1.132 Declaration filed April 2, 2007 provides evidence to support Appellants arguments traversing the obviousness rejections of the claims. Since the current obviousness rejections were not made until the final Office Action, this Declaration submitted with the After-Final Response was necessary and could not be presented earlier (since at least some of the statements made by the Declarant are in relation to the combination of references the Examiner used for the obviousness rejections).

In addition, the Examiner has already indicated in an Interview Summary mailed May 29, 2007, that this Declaration would be entered if an Appeal is filed. Therefore, the Examiner's own statement of record should also serve to show that good and sufficient reasons have already been provided by Appellants as to why this Declaration was in fact necessary and could not have been presented earlier.

Accordingly, it is presumed that the Declaration submitted with the 37 C.F.R. §1.132 Declaration filed April 2, 2007, is of record for this Appeal.

The current form of claims 92-106 is set forth in the Claims Appendix.

5. Summary of the Claimed Subject Matter

The claims on appeal are directed to methods of completing a sub-sea well using a christmas tree (such as a horizontal or vertical christmas tree), where control of the sub-sea well is maintained using at least two independently verifiable deep-set well control barriers. Support for these claim features can be found throughout the specification and drawings (see page 18, line 11 to page 38, line 29, Figs. 3-23). A "mapping" of the limitations of each of independent claims 92, 98 and 103 to specific paragraph sections of the specification and drawings has been provided below, where the specific paragraph sections of the specification (as identified by page and line numbers) and the drawings (including reference to specific drawing characters) identify exemplary embodiments described in the application that support such claim limitations. The specific "mapping" of claim limitations to specific drawing characters should in no way limit the claims to such exemplary embodiments.

Independent claim 92 recites a method of completing a sub-sea well using a horizontal christmas tree for production flow control (see, e.g., page 8, lines 9-29, page 18, line 11, to page 31, line 15, and Figs. 3-10 and 21-23), where the horizontal christmas tree has a body (see, e.g., page 26, line 23 to page 31, line 15, and christmas tree 50 shown in Figs. 6-10), and the method comprises forming an assembly by installing a completion string terminating at its upper end in and suspended from a tubing hanger in the body of the horizontal christmas tree (see, e.g., page 25, line 27 to page 28, line 26, and completion string 62, tubing hanger 60 and christmas tree body 50 shown in Figs. 6-10), the assembly being formed above the water line (see, e.g., page 27, lines 9-26, and water line 66 shown in Figs. 6 and 7), and running the assembly to the sub-sea well (see, e.g., page 27, lines 9-26, and well 10 shown in Figs. 6-9), where the tubing hanger and the horizontal christmas tree are above the water-line during the step of forming the assembly (see, e.g., page 27, lines 9-26, and christmas tree 50 and tubing hanger 60 are above water line 66 as shown in Figs. 6 and 7) while control of the well is maintained by using at least two independently verifiable deep-set well control barriers (see, e.g., page 8, lines 9-29, page 20, line 11, to page 31, line 15, and two independently verifiable deep-set well control barriers 26 and 30 shown in Figs. 3-10 and 21-23).

Independent claim 98 recites a method comprising coupling a tubing string with a christmas tree above water (see, e.g., page 26, line 23 to page 31, line 15, christmas tree 50 and

string 62 shown as being coupled above water line 66 in Figs. 6 and 7), and landing the christmas tree on a subsea wellhead (see, e.g., page 27, lines 9-26, christmas tree 50 being landed on a well 10 shown in Figs. 8 and 9) while maintaining control of the well using at least two independently verifiable deep-set well control barriers (see, e.g., page 8, lines 9-29, page 20, line 11, to page 34, line 7, and Figs. 3-15 and 21-23 showing two independently verifiable deep-set well control barriers 26 and 30).

Independent claim 103 recites a method (see, e.g., page 31, line 17 to page 36, line 2, Figs. 11-20) comprising coupling a tubing string with a tubing hanger above water (see, e.g., page 31, line 25 to page 32, line 12, Figs. 11 and 12 showing tubing hanger 60, tubing string 62 as well and wellhead 12, also page 34, line 35 to page 35, line 11, Figs. 17 and 18 showing tubing hanger 60, tubing string 62 and wellhead 12), landing the tubing hanger on a subsea wellhead (see, e.g., page 31, line 25 to page 32, line 12, Figs. 11 and 12 showing tubing hanger 60, tubing string 62 as well and wellhead 12, also page 34, line 35 to page 35, line 11, Figs. 17 and 18 showing tubing hanger 60, tubing string 62 and wellhead 12), and landing a christmas tree on the subsea wellhead (see, e.g., page 32, line 23 to page 34, line 6 and Figs. 12-15 showing christmas tree 51 and wellhead 12, as well as page 34, line 9 to page 36, line 2, and Figs. 18-20 showing christmas tree 51 and wellhead 12) while maintaining control of the well using at least two independently verifiable deep-set well control barriers (see, e.g., page 8, lines 9-29, page 20, line 24 to page 25, line 25, page 34, line 9 to page 36, line 2, and Figs. 17-23 showing two independently verifiable deep-set well control barriers 26 and 30).

Support for the dependent claims 93-97, 99-102 and 104-108 can also be found throughout the specification and drawings (see, e.g., page 18, line 11 to page 38, line 29, Figs. 3-23).

6. Grounds of Rejection to be Reviewed on Appeal:

The issue presented on Appeal is:

A. Whether claims 92-102 are properly rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,256,937 to Haeber et al. (hereinafter referred to as "Haeber") in view of U.S. Patent No. 5,404,946 to Hess (hereinafter referred to as "Hess").

B. Whether claims 103-106 are properly rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 7,063,157 to Bartlett (hereinafter referred to as "Bartlett") in view of Hess.

C. Whether claim 98 is properly rejected (as a provisional rejection) on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 17 of copending U.S. Patent Application Serial No. 11/474,314.

7. Arguments:

A. Rejections Under 35 U.S.C. §103(a)

35 U.S.C. §103(a) states (in pertinent part):

> "(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains..."

The Supreme Court in Graham v. John Deere, 148 U.S.P.Q. 459 (1966), stated that the obviousness or non-obviousness of subject matter is determined in view of the scope and content of the prior art, the differences between the prior art and the claims at issue and the level of ordinary skill in the pertinent art. Secondary considerations, such as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. See M.P.E.P. §2141.

In addition, the Supreme Court in KSR Int'l Co. v. Teleflex, Inc., 82 U.S.P.Q.2d 1385, 1395 (2007) further indicated that the combination of familiar elements according to known methods is likely to be obvious when it does no more than produce predictable results. Accordingly, a court must determine whether the improvement is more than the predictable use of prior art elements according to their established functions. Id. at 1396. Since the claimed subject matter may involve more than a simple substitution of one known element for another or the mere application of a known technique to the prior art, it will often be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed. This analysis should be made explicit. Id. The Court further noted that a patent composed of several elements is not proved obvious merely by showing that each of its elements was, independently, known in the prior art. In these types of cases, identification of the reason that would have prompted a person of ordinary skill in the

relevant field to combine the elements in the manner of the claimed invention can be important. Id. When the prior art teaches away from combining certain known elements, discovery of a successful manner to combine them is more likely be nonobvious. Id. at 1395.

1. Background of invention

A background describing deep-sea well formation, suspension and completion operations has been provided in the application (pages 1-7), and this background has also been briefly described in the two Rule 132 Declarations of record. A brief summary of this background is also provided here in that it is believed to be useful in providing an understanding and appreciation of the invention and why the claims should not be considered obvious in view of the cited art.

During sub-sea well completions, suspension and work-over operations, most jurisdictions governing the area in which the sub-sea well is being formed have statutory requirements mandating the use of two independently verifiable barriers within the well bore at all times to retain control of the well. The independent barriers must prevent any flow of hydrocarbons up through the well bore and be able to hold reservoir pressure applied from below the barrier.

The longstanding and well-accepted industry practice when suspending a well is to provide one barrier below an anticipated depth of the lowermost end of a completion string (this barrier is referred to as the "deep set plug") and to provide a second barrier toward an upper end of the well bore (this barrier is referred to as the "shallow plug"). Evidence of this conventional and longstanding industry practice is provided in the two Rule 132 Declarations of Paul Anthony Kelley (which were filed on January 26, 2006, and on April 2, 2007, also attached with this Appeal Brief in the Evidence Appendix). These two Declarations establish that Mr. Kelley is a person who constitutes one having ordinary skill in the oil and gas industry, and in particular in the field of deep sea well completions, suspension and work-over operations.

As noted by Mr. Kelley in the Rule 132 Declarations, the shallow plug must be removed during completion of a well because it presents an obstacle to the installation of the tubing or completion string. The deep set plug is left in place until well production (i.e., the flow of hydrocarbons from the well bore) is initiated. Before removing the shallow plug, a blow out

preventer (BOP) stack must be installed in the well to satisfy the statutory requirement that two independently verifiable barriers are maintained in the well. The BOP stack includes a series of shut-off valves that satisfy the requirement of a second barrier. When the well is completed, a plug is typically placed in the tubing hanger to allow for removal of the BOP stack.

In the two Rule 132 Declarations, Mr. Kelley notes certain reasons for why there has been a longstanding industry practice of providing a deep set plug and a shallow plug. Such reasons include the fact that the shallow plug can be easily retrieved and further that, by placing the shallow and deep set barriers as far apart as possible from each other, the ability to independently verify each barrier is easy and reliable.

As further noted by Mr. Kelley in the Declarations, there is a significant cost associated with using a BOP stack. In particular, Mr. Kelley notes that the cost of running and retrieving a BOP stack is one of the most expensive operations associated with sub-sea well construction, which can amount to millions of dollars for each BOP stack which must be removed from a sub-sea well.

A key feature of the present invention was the recognition by the inventors that, in breaking with longstanding industry practice, two deep set barriers could be utilized (rather than one deep set plug and one shallow plug) that are independently verifiable, where both deep set barriers are placed at a location within the well bore that is below the depth of a lowermost end of a tubing string to be installed in the well. The inventors were further able to verify the integrity of each deep set barrier. The use of two deep set barriers in accordance with the invention obviates the need for a BOP stack, which in turn results in a significant cost savings for sub-sea well operations. In particular, the two Rule 132 Declarations of record indicate that the implementation of the present invention in sub-sea well completion operations amounts to an annual cost savings of several millions of U.S. dollars.

2. Claims 92-102 are improperly rejected under 35 U.S.C. §103(a) as being unpatentable over Haeber in view of Hess.

Each of independent claims 92 and 98 recites the feature that control of a well is maintained using at least two independently verifiable deep-set well control barriers.

In particular, claim 92 recites a method of completing a sub-sea well using a horizontal

christmas tree for production flow control, the horizontal christmas tree having a body, the method comprising the steps of forming an assembly by installing a completion string terminating at its upper end in and suspended from a tubing hanger in the body of the horizontal christmas tree, the assembly being formed above the water line, and running the assembly to the sub-sea well. Claim 92 further recites that the tubing hanger and the horizontal christmas tree are above the water-line during the step of forming the assembly while control of the well is maintained by using at least two independently verifiable deep-set well control barriers.

Claim 98 recites a method comprising coupling a tubing string with a christmas tree above water, and landing the christmas tree on a subsea wellhead while maintaining control of the well using at least two independently verifiable deep-set well control barriers.

There is no combination of Haeber with Hess that renders obvious the combined features of each of claims 92 and 98.

Initially, it is noted that the *"deep-set"* language in the claims reciting *"at least two independently verifiable deep-set well control barriers"* is described in the specification (see page 8, lines 24-29) as providing at least two barriers that are located below the depth of the lowermost end of a tubing string (typically hung from a tubing hanger or other equipment) when the tubing string is installed in its final position in a well. The term *"barrier"* is described in the specification (see page 1, lines 28-31) as a physical measure that is capable of forming a seal so as to prevent an uncontrolled release or flow of fluid from the pressure side of the barrier. Thus, the *"independently verifiable deep-set well control barriers"* of the claimed invention are barriers provided at a *"deep-set"* location within the well that are independently verifiable of each other so as to facilitate a completion or tubing string to be run into the well with the christmas tree as a single assembly.

Haeber describes an underwater well completion method, in which at least one blow out preventer (BOP) is used during the drilling and completion stages, and further where the BOP is removed before running a combined christmas tree and tubing string in open water during well completion. After removal of the BOP and prior to setting of the wellhead assembly or christmas tree, a Baker Oil Tool, Inc., Model "D" wire-line-set single bore production packer 217 is installed in the inner casing string 183 in combination with a wire line retrievable plug

218 (see Col. 12, lines 57-75 and Fig. 30 of Haeber). In addition, Haeber describes that a Brown Oil Tool Co. dual bore hydraulic-set production packer 205 may be run into the well on the first tubing string 192 to seat the bottom of the second tubing string 196 against the casing after the tubing string 196 has been run into the well.

The production packer 205 of Haeber provides no barrier whatsoever to the flow of hydrocarbons from the well during the completion stage. Rather, when the tubing strings 192 and 196 are withdrawn upwardly to the barge 11 described in Haeber, the production packer 205 stays in position in the well bore such that hydrocarbons flow through the bore of the packer 205. Accordingly, Haeber fails to teach the feature of at least two independently verifiable deep-set well control barriers as recited in claims 92 and 98.

The Examiner acknowledges that Haeber fails to teach the feature of two independently verifiable deep-set well control barriers as recited in these claims. However, the Examiner asserts that it would have been obvious to provide such a feature in Haeber based upon the teachings of Hess.

As noted above, the Rule 132 Declarations of Mr. Kelley clearly establish that the longstanding industry practice has been to use a deep set plug and a shallow plug, rather than two deep-set well control barriers as recited in the claims. In addition, the Rule 132 Declarations of Mr. Kelley clearly establish the usefulness and significant commercial success of the invention, which should serve as strong evidence that the novel feature of using at least two independently verifiable deep-set well control barriers is not an obvious modification to conventional deep sea well suspension and completion techniques.

The Declarations of Mr. Kelley provide strong evidence in relation to a determination of obviousness (see, e.g., MPEP § 2141 and *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), which set forth commercial success and long felt but unsolved needs in the industry as two secondary considerations in the determination of obviousness). In particular, these Declarations provide strong evidence that the claimed invention provides a significant cost savings over the conventional approach of using one deep-set barrier and one shallow barrier, since the claimed invention obviates the need for a BOP stack used to ensure two independently verifiable well control barriers are in place at all times during suspension of a well.

If the novel feature of using two independently verifiable deep-set barriers as recited in the claims was simply an obvious modification of Haeber, the question arises as to why there is no teaching of such feature in any of reference of record in this application or in conventional industry practice in relation to completing and maintaining a deep-sea well, particularly since providing such a feature results in significant cost savings benefits?

There is simply no apparent reason, absent improper hindsight and reliance upon the invention of the subject application, to provide at least two independently verifiable and deep-set well control barriers for the methods taught in Haeber. At best, one of ordinary skill in the art would have been motivated, based upon longstanding and conventional industry standards, to utilize one deep-set plug and one shallow plug during the suspension of the deep sea wells of Haeber, which is significantly different from the claimed invention.

However, even if the showing of strong secondary considerations in relation to the non-obvious of the claimed invention (based upon the evidence provided in the form of the two Rule 132 Declarations) is to be totally disregarded, there is still no combination of Haeber with Hess that teaches or suggests the combination of features of each of claims 92, 98 and 103.

Hess describes a wireline-powered inflatable-packer system including a borehole probe used to take geophysical measurements for formation evaluation in an open hole or bore hole. Referring to Fig. 1A of Hess, a packer system is shown that includes an inflatable packer 1 connected by tubing 2 to a valve chamber 4, where the valve chamber 4 controls the flow of a borehole liquid from a pump system 3 to inflate or deflate packer 1. A winch 21, located at the surface, controls movement of the packer system within the borehole and is connected through a logging cable 8 to an electronic unit 11 containing probe electronics. The packer pump system 3 receives electrical power from a pump control panel 7 on the surface and through cable 8. Clearly, the packer system of Hess remains connected via a cable to components at the surface during all operations of the packer system.

Hess further describes an embodiment in Fig. 2 in which two or more packers 12, 13 are connected together and inflated with a single packer pump 3, where electricity is run from the surface to pump 3 via cable 8 to inflate or deflate the packers. A check valve 22 (shown in Fig. 3 of Hess) keeps the packers 12, 13 inflated when the pump ceases operation. Clearly, the two

packers 12, 13 in the system described by Fig. 2 of Hess are not independent of each other. To the contrary, a single check valve maintains the integrity of both packers. If this check valve fails, the integrity of the seal for both packers will be jeopardized. In addition, if one packer is ruptured so as to fail and become unsealed within the borehole, the other packer (which is connected to the ruptured packer) would become unsealed as well.

The Examiner asserts that Hess teaches two independently verifiable deep-set well control barriers in order to control movement of borehole fluid at any desired depth within a borehole, and further that one of ordinary skill in the art would be motivated to modify Haeber to provide a dual packer system at a deep-set location based upon the teachings of Hess. These assertions are flawed for a number of reasons.

First, it is noted that Haeber relates to suspending and maintaining an underwater well, whereas Hess relates to using a single or multiple packer system in a producing well. In other words, the borehole probe of Hess is not designed or intended for being run into a well, set, released and then maintained in a well for later retrieval after well completion (e.g., as in the underwater well completion method described in Haeber). Rather, as is clearly evident from the teachings of Hess, the packers 12, 13 remain connected to surface equipment (i.e., equipment located on the ocean vessel) via cable 8 to render the packers operable. It therefore unclear as to how or why one of ordinary skill in the art would utilize the wireline-powered packer system of Hess (with single or dual packers) as a replacement for any deep-set barrier during completion of a well, since the packer system of Hess is clearly intended for on-site use during well production and <u>not</u> for creating a barrier and then leaving the barrier in place until a later time when the well is to be accessed.

Further, Hess teaches using multiple packers when it is desirable to measure static pressure of the borehole fluid in multiple hydraulic zones corresponding to the regions that are in hydraulic communication with the liquid in multiple fractures (see Col. 4, lines 26-37 of Hess). This would not immediately suggest to one having ordinary skill in the art to use such a dual or multiple packer system in a deep-set location during completion of a well, particularly at a time when there is no flow of hydrocarbons within the well (i.e., at a time before the well is in a production phase). Thus, given the differences between Haeber and Hess, it is respectfully

submitted that one having ordinary skill in the art at the time of the invention would not have looked to Hess to modify Haeber in a manner that renders obvious any of claims 92, 98 and 103.

Further still, Hess fails to teach two independently verifiable deep-set barriers as recited in the claims. As noted above, the multiple packers in the embodiment of Fig. 2 of Hess are not independent of each other and thus not independently verifiable in the manner recited in the claims. Rather, as noted above, the packers 12, 13 of Hess are clearly dependent upon each other for maintaining a seal within the borehole at their respective locations. Both packers 12, 13 of Hess are inflated and deflated together to form and release a seal, and the leak or failure of one packer will result in failure of the other. Since there does not appear to be a scenario in which one packer of Hess could fail while the other maintains a seal (i.e., both packers stand or fall together), it is not clear how Hess teaches or suggests two barriers that are independently verifiable as recited in the claims.

There is further no disclosure or suggestion in Hess of placing any of the packers at a deep-set location as recited in the claims. In other words, there is no disclosure or suggestion in Hess of placing two packers at a location that is below the depth of the lowermost end of a tubing string (typically hung from a tubing hanger or other equipment) when the tubing string is installed in its final position in a well.

In addition, in the Declaration of Mr. Kelley that was filed April 2, 2007, Mr. Kelley provides his opinion (which is at least at the level of one having ordinary skill in the art of deep-sea well completions, suspension and work-over operations) that it would not have been obvious to combine Hess with Haeber in the manner suggested by the Examiner to provide two deep-set barriers in Haeber. In particular, Paragraphs 11-14 of this Declaration set forth Mr. Kelley's opinion that providing an inflatable packer such as is taught in Hess as a deep-set barrier in Haeber would present a greater risk in slippage and migration of the packer in comparison to using the plug taught in Haeber, thus making the packer system of Hess less desirable for use as a deep-set barrier. It is therefore Mr. Kelley's opinion that one having ordinary skill in the art would not have been motivated to utilize the packer system of Hess for providing a barrier in Haeber.

For all of the foregoing reasons, it is respectfully submitted that there is no reasonable combination of Haeber with Hess that renders obvious claims 92 and 98. Since claims 93-97 and 99-102 depend from one of claims 92 and 98 (and thus include all of the limitations of their parent claims), there is no combination of Haeber with Hess that renders obvious these claims.

The rejection of claims 98-102 as being obvious over Haeber in view of Hess is improper and should be withdrawn.

3. Claims 103-106 are improperly rejected under 35 U.S.C. §103(a) as being unpatentable over Bartlett in view of Hess.

Claim 103 recites a method comprising coupling a tubing string with a tubing hanger above water, landing the tubing hanger on a subsea wellhead, and landing a christmas tree on the subsea wellhead while maintaining control of the well using at least two independently verifiable deep-set well control barriers.

As noted above for the previous claims, the *"deep-set"* language in the claims reciting *"at least two independently verifiable deep-set well control barriers"* is described in the specification (see page 8, lines 24-29) as providing at least two barriers that are located below the depth of the lowermost end of a tubing string (typically hung from a tubing hanger or other equipment) when the tubing string is installed in its final position in a well. The term *"barrier"* is described in the specification (see page 1, lines 28-31) as a physical measure that is capable of forming a seal so as to prevent an uncontrolled release or flow of fluid from the pressure side of the barrier. Thus, the *"independently verifiable deep-set well control barriers"* of the claimed invention are barriers provided at a *"deep-set"* location within the well that are independently verifiable of each other.

There is no combination of Bartlett with Hess that renders obvious the combination of features as recited in claim 103.

As noted above, the Rule 132 Declarations of Mr. Kelley provide evidence of strong secondary considerations that should be sufficient to show that the claimed invention (including the feature of using at least two independently verifiable deep-set well control barriers in a subsea well formation operation) is not obvious. Accordingly, the Declarations of Mr. Kelley

should serve as suitable evidence to overcome the Examiner's assertion that claim 103 is obvious over Bartlett in view of Hess.

However, even without such evidence of secondary considerations, there is still no combination of Bartlett with Hess that can be reasonably construed as rendering obvious claim 103.

Bartlett describes an apparatus and method for installation of sub-sea well completion systems. As shown in Fig. 1 of Bartlett, a conductor pipe 12 is secured in the sea floor, with a conductor housing 16 secured to an end of the pipe, a completions guide base or CGB 18 secured to the conductor housing, and a wellhead 20 landed in the housing. A vertical christmas tree 22 is connected to the top of the wellhead 20. A first casing hanger 40 is connected to a first casing string 42 and landed in the wellhead 20, followed by a second casing hanger 44 being connected to a second casing string 46 and landed in the wellhead 20 above the first casing hanger 40 as shown in Fig. 2. A tubing hanger 48 is then connected to a top portion of a tubing string 50 and landed in the second casing hanger 44.

Bartlett further teaches that, once the tubing hanger 48 is landed, a production bore 56 of the tubing hanger 48 is sealed by a wireline plug that is installed through the running string and a tubing hanger running tool or THRT 96 that is used to land the tubing hanger (see Col. 4, lines 40-67, of Bartlett). The wireline plug is required to provide an additional barrier between the well bore and the environment until the christmas tree 22 can be installed on the wellhead 20. Once the christmas tree 22 is installed, the wireline plug is removed using a ROV operated subsea lubricator or ROSL 106 (see Col. 5, lines 1-36, of Bartlett).

Bartlett fails to teach the use of a deep-set barrier, since the wireline plug of Bartlett is provided in the tubing hanger production bore and not at a location that is below the depth of the lowermost end of a tubing string (typically hung from a tubing hanger or other equipment) when the tubing string is installed in its final position in the well.

The Examiner acknowledges that Bartlett fails to teach at least two independently verifiable deep-set barriers are recited in claim 103.

However, the Examiner asserts that it would have been obvious to modify Bartlett to provide two independently verifiable deep-set barriers based upon the teachings of Hess. As

with the rejection of claims 92 and 98 based upon Haeber in view of Hess, the Examiner asserts that Hess teaches the use of two independently verifiable deep-set barriers. This assertion is improper for the following reasons.

As noted above, Hess does not teach two independently verifiable barriers. Rather, the dual packer system described in Hess uses two packers 12, 13 that are dependent upon each other in that they inflate and deflate together, and the failure of one packer will result in the failure of the other (since they are connected together and operated by a single pump 3 and single check valve 22). Further, there is no teaching in Hess of providing any of the packers at a deep-set location in the manner as recited in claim 103.

In addition, Bartlett would have to be significantly modified in order to accommodate the wireline-powered inflatable packer system of Hess. In particular, Bartlett would have to be modified in the following manner: 1. the location of the wireline plug of Bartlett, which is described as being located in the tubing hanger production bore, would have to be moved to a deep-set location as recited in claim 103; and 2. the wireline plug of Bartlett would have to be switched with a dual packer system as taught in Hess, at such deep-set location. There is no apparent reason to provide such wholesale changes to Bartlett in the manner suggested by the Examiner, absent improper hindsight and reliance upon the teachings of the present application.

In the Rule 132 Declaration filed April 2, 2007, Mr. Kelley further provides his opinion regarding the suggested combination of Bartlett with Hess (see paragraph 15 of this Declaration). In particular, Mr. Kelley provides his opinion (which is at least at the level of one having ordinary skill in the art of well completions, suspension and work-over operations) that there is no motivation to replace the wireline plug of Bartlett (which is not even a single deep-set barrier as recited in the claims) with a dual or even a single packer system as taught in Hess. Mr. Kelley indicates that this is because an inflatable packer as taught in Hess is not suitable for placement in a tubing hanger production bore (i.e., the location in Bartlett in which the wireline plug is located).

For all of the foregoing reasons, it is respectfully submitted that there is no reasonable combination of Bartlett with Hess that renders obvious claim 103. Since claims 104-106 depend

from claim 103 (and thus include all of the limitations of their parent claim), there is also no combination of Bartlett with Hess that renders obvious these claims.

The rejection of claims 103-106 as being obvious over Bartlett in view of Hess is improper and should be withdrawn.

B. Rejection Based Upon Ground of Nonstatutory Obviousness-Type Double Patenting

A rejection of nonstatutory double patenting is based on a judicially created doctrine grounded in public policy so as to prevent the unjustified or improper timewise extension of the right to exclude granted by a patent. See, e.g., In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); and In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982). A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s).

A double patenting rejection between a parent application and a divisional application filed in accordance with 35 U.S.C. §121 is generally prohibited. In particular, 35 U.S.C. §121 prohibits the use of a patent issuing on an application with respect to which a requirement for restriction has been made, or on an application filed as a result of such a requirement, as a reference against any divisional application, if the divisional application is filed before the issuance of the patent.

The Manual of Patent Examining Procedures (MPEP § 804.01) provides a listing of certain situations in which the prohibition against double patenting rejections under 35 U.S.C. §121 does not apply:

(A) The applicant voluntarily files two or more applications without a restriction requirement by the examiner.

(B) The claims of the different applications or patents are not consonant with the restriction requirement made by the examiner, since the claims have been changed in material respects from the claims at the time the requirement was made. For example, the divisional application filed includes additional claims not consonant in scope to the original claims subject to restriction in the parent. See, e.g., Symbol Technologies, Inc. v. Opticon, Inc., 935 F.2d 1569, 19 USPQ2d 1241 (Fed. Cir. 1991) and Gerber Garment Technology, Inc. v. Lectra Systems, Inc., 916 F.2d 683, 16 USPQ2d 1436 (Fed. Cir. 1990). In order for consonance to exist, the line of demarcation between the independent and distinct inventions identified by the examiner in the requirement for restriction must be maintained. Gerber Garment Technology, 916 F.2d at 688, 16 USPQ2d at 1440.

(C) The restriction requirement was written in a manner which made it clear to applicant that the requirement was made subject to the nonallowance of generic or other linking claims and such generic or linking claims are subsequently allowed. Therefore, if a generic or linking claim is subsequently allowed, the restriction requirement must be withdrawn.

(D) The requirement for restriction (holding of lack of unity of invention) was only made in an international application by the International Searching Authority or the International Preliminary Examining Authority.

(E) The requirement for restriction was withdrawn by the examiner before the patent issues.

(F) The claims of the second application are drawn to the "same invention" as the first application or patent. See, e.g., Studiengesellschaft Kohle mbH v. Northern Petrochemical Co., 784 F.2d 351, 228 USPQ 837 (Fed. Cir. 1986).

(G) Where a requirement for restriction between a product, a process of making the product, and a process of using the product was made subject to the non-allowance of the product and the product is subsequently allowed. In this situation the restriction requirement must be withdrawn.

1. Claim 98 is improperly provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 17 of copending U.S. Patent Application Serial No. 11/474,314

U.S. Patent Application Serial No. 11/474,314 ("the '314 application") is a divisional of the present application. This divisional application was filed as a result of the Examiner making a restriction requirement in the Office Action mailed April 10, 2006, where the Examiner indicated that claims 1-91 (which included claims directed to methods of suspending a well, as recited in independent claim 1, methods of completing a well, as recited in independent claim 12, and methods of working over a completed well, as recited in independent claim 29), were drawn to a *"separate and distinct invention"* from claims 92-106 (which were directed to methods of completing a subsea well). In a Response filed June 6, 2006, Applicants elected, without traverse, claims 92-106 for prosecution in the present application, while non-elected claims 1-91 were canceled. The subject matter of non-elected and canceled claims 1-91 is being pursued in the '314 application.

The claims in the '314 application include method claim 1, which recites method steps that are of the same basic scope as non-elected (and now canceled) claim 1 of the present application. Claim 1 of the '314 application is also similar to non-elected (and now canceled) claims 12 and 29. Thus, the original claim 1 has not changed in scope of the invention being claimed from that which was restricted and withdrawn in the parent application.

Claim 17 of the '314 application depends from claim 12, which depends from claim 1. Thus, claim 17 of the '314 application includes all of the limitations its parent claim 1.

The version of claim 98 that was present when the Examiner made the restriction requirement (i.e., the version as set forth in the Amendment filed January 26, 2006) recited a method comprising coupling a tubing string with a christmas tree above water, and landing the christmas tree on a subsea wellhead. This claim has since been amended (in an Amendment filed November 14, 2006) to include the additional feature that the christmas tree is landed on a subsea wellhead while maintaining control of the well using at least two independently verifiable deep-set well control barriers.

However, while claim 98 has been amended subsequent to the restriction requirement, the same basic invention is still being claimed regarding a method of completing a subsea well by coupling a tubing string with a christmas tree above water prior to landing the christmas tree on the subsea wellhead (i.e., the scope of the claim has not changed materially from what was claimed at the time the restriction was made). In addition, the invention of claim 98 is different from what is recited in claim 17 of the '314 application, since there is no recitation in claim 17 of performing any construction of flow control equipment above the water line prior to connecting with a wellhead.

Since it was the Examiner's position in the Restriction mailed April 10, 2006, that claims 1-91 and claims 92-106 of the present application fall into *"separate and distinct invention"* categories, the Examiner's current provisional double patenting rejection of claim 98 with respect to claim 17 (or any other claim) of the '314 application is improper and should be reversed.

For all of the foregoing reasons, Appellant respectfully submits that the rejections of claims 92-106 are improper and should be reversed.

Respectfully submitted,

/Andrew J. Aldag/
Andrew J. Aldag
Registration No. 40,483

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Date: January 10, 2008

8. Claims Appendix

1-91. (Canceled)

92. A method of completing a sub-sea well using a horizontal christmas tree for production flow control, the horizontal christmas tree having a body, the method comprising the steps of:

forming an assembly by installing a completion string terminating at its upper end in and suspended from a tubing hanger in the body of the horizontal christmas tree, the assembly being formed above the water line; and,

running the assembly to the sub-sea well, wherein the tubing hanger and the horizontal christmas tree are above the water-line during the step of forming the assembly while control of the well is maintained by using at least two independently verifiable deep-set well control barriers.

93. A method of completing a sub-sea well using a horizontal christmas tree for production flow control according to claim 92, wherein the step of forming the assembly further comprises the steps of landing and locking the tubing hanger in the body of the christmas tree.

94. A method of completing a sub-sea well using a horizontal christmas tree for production flow control according to claim 93, wherein the method further comprises the step of verifying the integrity of the completed assembly above the water line.

95. A method of completing a sub-sea well using a horizontal christmas tree for production flow control according to claim 94, wherein the step of verifying the integrity comprises the step of verifying hydraulic and electrical interfaces between the tubing hanger and the body of the christmas tree.

96. A method of completing a sub-sea well using a horizontal christmas tree for production flow control according to claim 94, wherein the step of verifying the integrity further

comprises the step of verifying the pressure integrity of the assembly.

97. A method of completing a sub-sea well using a horizontal christmas tree for production flow control according to claim 92, wherein the step of running the assembly to the well head comprises the step of using a lower-riser package.

98. A method comprising:

coupling a tubing string with a christmas tree above water; and

landing the christmas tree on a subsea wellhead while maintaining control of the well using at least two independently verifiable deep-set well control barriers.

99. The method of claim 98, wherein coupling the tubing string with the christmas tree comprises installing a tubing hanger on an uppermost joint of the tubing string and locking the tubing hanger to the christmas tree.

100. The method of claim 98, further comprising:

running the christmas tree, the tubing hanger, and the tubing string open-water to a well extending from the subsea wellhead.

101. The method of claim 100, wherein running the christmas tree, the tubing hanger, and the tubing string further comprises running the christmas tree, the tubing hanger, and the tubing string without a blow-out preventer.

102. The method of claim 98, wherein coupling the tubing string with the christmas tree comprises installing a tubing hanger on an uppermost joint of the tubing string, locking the tubing hanger in a tubing spool, and attaching the tubing spool to the christmas tree.

103. A method comprising:

coupling a tubing string with a tubing hanger above water;

landing the tubing hanger on a subsea wellhead; and

landing a christmas tree on the subsea wellhead while maintaining control of the well using at least two independently verifiable deep-set well control barriers.

104. The method of claim 103, further comprising:

latching the tubing hanger to the christmas tree.

105. The method of claim 103, further comprising:

latching the tubing hanger to the wellhead.

106. The method of claim 103, wherein landing the tubing hanger on the subsea wellhead further comprises landing the tubing hanger on the subsea wellhead via a tubing spool and latching the tubing hanger to the tubing spool.

9. Related Proceedings Appendix - None

10. Evidence Appendix

Two Declarations under 37 C.F.R. §1.132 ("Rule 132 Declarations") are attached with this Appendix. The first Rule 132 Declaration was filed on January 26, 2006, and should therefore be of record. The second Rule 132 Declaration was filed on April 2, 2007, and should also be of record (as indicated by the Interview Summary dated May 29, 2007).

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/678,636
Applicants	:	Peter Ernest Page et al.
Filed	:	June 10, 2003
Title	:	A METHOD OF SUSPENDING, COMPLETING AND WORKING OVER A WELL
Group Art Unit	:	3672
Examiner	:	Letoria House Confirmation No. : 7805

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. I, Paul Anthony Kelley, resident at 33 Clydesdale Street, Champion Lakes, WA 6111, Australia, am familiar with the subject matter of the above-identified application and the invention described herein ("the present invention"). I am not an inventor of the present invention.

2. I am currently employed as Completion Design Team Leader by Woodside Energy Limited, the assignee of the above-identified application. I hold a Bachelors degree in Electronics Engineering and have worked in the oil and gas industry since 1990 in the area of production technology and completions.

3. During well completions, suspension and work-over operations, we are obliged by law to ensure that two independently verifiable barriers are in place at all times to retain control of the well. The role of these barriers is to stop any flow of hydrocarbons up and out through the bore of the well. Each of the first and second well control barriers has to be able to at least hold reservoir pressure applied from below the barrier.

4. It is a longstanding and well-accepted industry practice when suspending a well to position one of the two well control barriers below the anticipated depth of the lowermost end of the completion string ("the deep set plug") with the second well control barrier being placed towards an upper end of the well-bore ("the shallow plug") to ensure that the first and second well control barriers are a long way apart. In order to complete a well, the shallow plug has to be removed as it presents an obstacle to the installation of the tubing or completion string. The deep set plug is left in place until it comes time to flow the well and start production. Before removing the shallow plug, a BOP stack must be installed at the well to satisfy the statutory requirement that two independently verifiable well control barriers be in place at all times. The BOP stack has a series of shut-off valves that we can use to serve the function of the second well control barrier. When the well is completed, a plug is typically placed in the tubing hanger to allow for the removal of the BOP stack.

5. There are two key drivers behind this longstanding standard industry practice of using one deep set plug and one shallow plug when suspending a well. The first driver is that the use of a shallow plug reduces the cost associated with using wireline to set or retrieve the second well control barrier. The second driver is that placement of the first and second well control barriers as far apart as possible makes it easier to independently verify the integrity of each of the two barriers.

6. Using standard industry practice, we set the deep set barrier in the well and then test that the first barrier is not leaking by filling the well-bore with a fluid and pressurising the column of fluid to a given pressure. Due to the compressibility of the fluid or entrapped gas, the pressure typically drops over a short period of time before leveling off. If the deep set barrier is leaking, the pressure does not level off and we know that remedial action must be taken. When the integrity of the deep set barrier has been verified, we run and set the shallow plug and repeat the procedure to test the integrity of the shallow barrier. Because the first and second well control barriers are placed so far apart, it is easy for us to identify which one is leaking, if this occurs.

7. The decision by the Inventors of the present invention to use two deep set barriers instead of one deep set barrier and a shallow barrier overcomes the need to remove one of the barriers running the completion into the well. This in turn means that we no longer need to use the BOP stack. The Inventors use a transducer placed between the first and second deep set barriers to allow us to independently verify that both the first and the second deep set barriers are able to hold reservoir pressure. We would not be able to use two deep set barriers for well control if we were unable to independently verify their integrity.

8. The present invention is a remarkably simple idea which has significant flow-on advantages over standard industry practice in terms of time and money. The running and retrieval of a BOP stack is one of the costliest operations associated with sub-sea well construction. As a well operator, we hire the BOP equipment and the specialized vessels that deploy these BOP stacks from external third parties at an average cost of approximately half a million US dollars per day depending on the size and type of rig being deployed and the country in which the operation is taking place. Any procedure that allows us to reduce the costs associated with deploying a BOP stack is extremely attractive to us.

9. The present invention was used successfully for the drilling and completion of 12 wells at Chinguetti, off the coast of Western Africa in 2005. Chinguetti is a particularly deep water location and we calculated that we would have needed approximately seven days to run and retrieve the BOP from this depth. Use of the present invention at Chinguetti allowed us to avoid the need to use the BOP during suspension and completion operations at an approximate saving of USD 3,000,000 per well in rig time for each of the 12 wells at this location. We were also able to eliminate a separate trip per well to independently land the Christmas tree with an additional saving of approximately 5.5 days of rig time for this field.

10. The present invention was also used successfully for the drilling and completion of 13 wells at Enfield, off the coast of Western Australia in 2005. Use of the present invention at Enfield allowed us to avoid the need to use the BOP during suspension and completion operations at a saving of AUD 2-3 million per well for

each of the 13 wells at this location. We were also able to eliminate a separate trip per well to independently land the Christmas tree with an additional saving of approximately 6 days of rig time for this field.

11. During our drilling operations at both Enfield and Chinguetti, we were able to suspend the wells with the two deep-set barriers in place. When we came back to complete the wells, we topped up the well bore with completion fluid and pressure tested to verify the two deep-set barriers. The pressure reading from the transducer placed between the first and second deep-set barriers in the present invention allowed us to independently verify both of the two deep-set barriers.

12. I have read and understood the specification filed for US patent application 2003/0196820 ("the Patel reference"). I fail to see why the Patel reference was considered to be relevant to the present invention. The Patel reference refers to completions but in a different context to that of the present invention. The Patel reference describes the use of barriers to isolate multiple zones in a producing well. In contrast, the present invention relates to the use of barriers to maintain control over a non-producing well during suspension, completion or work-over operations. The role of the well control barriers of the present invention is to prevent all flow of hydrocarbons from the well.

13. The "barrier" described in the Patel reference is an External Casing Packer which is deployed in the annulus between the outer diameter of the casing string and the inner diameter of the well bore wall. An External Casing Packer is suitable to use for zonal isolation but is inherently unsuitable for use in the present invention. The reason for this is that an External Casing Packer provides no barrier to the flow of hydrocarbons from below the lowermost packer seal element through the internal bore of the completion string and thus cannot prevent the flow of hydrocarbons from the well. If an External Casing Packer were to be installed below the lowermost end of the completion string, the External Casing Packer itself would have an open internal bore through which hydrocarbons could freely flow. The External Casing Packer could not serve the

function of a deep set barrier unless modified in some way or used in conjunction with another type of well control barrier.

14. I have read and understood the specification filed for US patent 6,810,954 ("the Garrett reference"). The Garrett reference does not describe forming a completed assembly of a christmas tree with a tubing hanger landed in the body of the christmas tree and run into the well as a completed assembly. The present invention has made it possible for the first time to use two deep set barriers and independently verify the integrity of each of the two deep set barriers. It is this breakthrough that makes it possible for the first time to form a completed assembly (made up of the christmas tree plus tubing hanger plus completion string) above the water line and run this as a completed assembly to the well. Using standard industry practice, this would not be possible because the shallow barrier would be an obstruction that needs to be removed before running the completion into the well. As stated above at paragraph 4, using standard industry practice, the shallow barrier cannot be removed without first installing a BOP stack. It is not possible to run the christmas tree without first removing the BOP stack.

15. I note that Claim 22 of the Garrett reference describes the installation of a side valve tree onto a wellhead and the landing of the tubing hanger in the side valve tree as a separate and subsequent operation. The Garrett reference then describes the installation of an actuation mandrel in the side valve tree above the tubing hanger with the well control plugs being installed in the actuation mandrel instead of in the tubing hanger (which would otherwise be standard industry practice before the present invention). Although not expressly described in the Garrett reference, the well completion procedure would require the use of a BOP stack to supplement well control until the actuation mandrel has been installed. The side valve tree would be installed on the wellhead first. A BOP stack would then need to be run on top of the side valve tree, to supplement well control and allow the removal of the shallow barrier that would have been in place in the suspended well. The tubing hanger and tubing would be run into the well through the internal bore of the BOP stack in a separate operation to the running

of the tree. The BOP stack would be removed after the actuation mandrel (with its the plurality of well control barriers) has been installed.

16. Using the present invention, the tubing hanger, and the completion string can be installed in the christmas tree above the water line which provides a huge advantage in that we can verify the integrity of the hydraulic and electrical connections above the water line. In the Garrett reference, the tubing hanger is installed in the christmas tree sub-sea which is far more difficult and expensive.

17. I see no connection between the Garrett reference and the Patel reference whatsoever.

18. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Paul Anthony Kelley
Date: 12/1/06

Witness: Dr Marguerite Rosanne Port
Date: 12/1/06

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/678,636
Applicants	:	Peter Ernest Page et al.
Filed	:	June 10, 2003
Title	:	A METHOD OF SUSPENDING, COMPLETING AND WORKING OVER A WELL
Group Art Unit	:	3672
Examiner	:	Nicole Coy Confirmation No. : 7805

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. I, Paul Anthony Kelley, resident at 33 Clydesdale Street, Champion Lakes, WA 6111, Australia, am familiar with the subject matter of the above-identified application and the invention described herein ("the present invention"). I am not an inventor of the present invention.

2. I am currently employed as Completion & Well Services Manager by Woodside Energy Limited, the assignee of the above-identified application. I hold a Bachelors degree in Electronics Engineering and have worked in the oil and gas industry since 1990, including ten years working in the area of completions.

3. In paragraphs 4 to 9 below, I repeat some of the statements that I made in an earlier filed Declaration made in respect of the present invention.

4. During well completions, suspension and work-over operations, we are obliged by law to ensure that two independently verifiable barriers are in place at all times to retain control of the well. The role of each of these barriers is to stop any flow of hydrocarbons up and out through the bore of the well. Each of the first and second well control barriers has to be able to at least hold reservoir pressure applied from below the barrier.

5. It is a longstanding and well-accepted industry practice when suspending a well to position one of the two well control barriers below the anticipated depth of the lowermost end of the completion string ("the deep set plug") with the second well control barrier being placed towards an upper end of the well-bore ("the shallow plug") to ensure that the first and second well control barriers are a long way apart. In order to complete a well, the shallow plug has to be removed as it presents an obstacle to the installation of the tubing or completion string. The deep set plug is left in place until it comes time to flow the well and start production. Before removing the shallow plug, a BOP stack must be installed at the well to satisfy the statutory requirement that two independently verifiable well control barriers be in place at all times. The BOP stack has a series of shut-off valves that we can use to serve the function of the second well control barrier. When the well is completed, a plug is typically placed in the tubing hanger to allow for the removal of the BOP stack.

6. There are key drivers behind this longstanding standard industry practice of using one deep set plug and one shallow plug when suspending a well. The first driver is that the use of a shallow plug reduces the cost associated with using wireline to set or retrieve the second well control barrier. The second driver is that placement of the first and second well control barriers as far apart as possible makes it easier to independently verify the integrity of each of the two barriers.

7. Using standard industry practice, we set the deep set barrier in the well and then test that the first barrier is not leaking by filling the well-bore with a fluid and pressurising the column of fluid to a given pressure. Due to the compressibility of the fluid or entrapped gas, the pressure typically drops over a short period of time before leveling off. If the deep set barrier is leaking, the pressure does not level off and we know that remedial action must be taken. When the integrity of the deep set barrier has been verified, we run and set the shallow plug and repeat the procedure to test the integrity of the shallow barrier. Because the first and second well control barriers are placed so far apart, it is easy for us to identify which one is leaking, if this occurs.

8. The decision by the Inventors of the present invention to use two deep set barriers instead of one deep set barrier and a shallow barrier overcomes the need to remove one of the barriers prior to running the completion into the well. This in turn means that we no longer need to use the BOP stack. The Inventors use a transducer placed between the first and second deep set barriers to allow us to independently verify that both the first and the second deep set barriers are able to hold reservoir pressure. We would not be able to use two deep set barriers for well control if we were unable to independently verify their integrity.

9. The present invention is a remarkably simple idea which has significant flow-on advantages over standard industry practice in terms of time and money. The running and retrieval of a BOP stack is one of the costliest operations associated with sub-sea well construction. As a well operator, we hire the BOP equipment and the specialized vessels that deploy these BOP stacks from external third parties at an average cost of approximately USD 300,000 - 500,000 per day depending on the size and type of rig being deployed and the country in which the operation is taking place. Any procedure that allows us to reduce the costs associated with deploying a BOP stack is extremely attractive to us.

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10. A well control barrier is a device that is designed to be run into the well and set in position and then released and left behind in the well to prevent the flow of hydrocarbons. In the present invention, two well control barriers are set in this way, both of them being deep-set barriers. Once the two deep set well control barriers of the present invention are run into position, they are set and released and remain in the well until the completion has been run into the well. When the time comes to retrieve the two deep set well control barriers of the present invention, they are retrieved through the tubing of the completion.

11. I have read and understood the specification filed for US patent 5,404,946 ("the Hess reference"). The borehole probe described in the Hess reference is used to take geophysical measurements for formation evaluation in an open hole or borehole. It is not a device that has been designed to work as a well control barrier in that it is not a device that has been designed to be run into the well, set, released, left behind and later retrieved after the completion has been installed. It is difficult to tell the dimensions of the inflatable packer of the Hess reference, so it is not clear to me whether or not the inflatable packer could be deflated and retrieved through the tubing after the completion has been run into the well.

12. Figure 2 of the Hess reference shows two inflatable packers (12) and (13) connected together, which are inflated using a single bidirectional packer pump (3). Electricity to run the pump (3) is provided via the logging cable (8). Once inflated, both packers rely on a single one-way check valve (22) to keep both of the packers inflated when the pump is stopped. The integrity of both inflatable packers in Figure 2 relies on the integrity of a single check valve (22). Each of the packers (12) and (13) could be considered to be a barrier to fluid flow when inflated. However, these two barriers are not independent of each other. On the contrary, if the check valve (22) fails or leaks, the integrity of both packers 12 and 13 will be lost. Similarly, failure of either of the packers (for example if one of the packers ruptured) would inevitably cause the second one to fail as well.

13. Referring to paragraphs 7 and 8 above, one of the key features of the present invention is the decision to place both of the two independently verifiable well control barriers in a "deep-set" location as this placement allows for the completion or tubing string to be run into the well with the christmas tree as a single assembly. Nothing in the Hess reference suggests that I should place the dual packer system of Figure 2 in such a way. All that the Hess reference is telling me, is that I should use two inflatable packers across an interval if I need to measure pressure and flow rates for multiple zones either side of the interval.

14. I have read and understood the specification filed for US patent 3,256,937 ("the Haeber reference"). The Haeber reference describes the use of only one deep-set barrier to maintain well control. There is no comparison between the Haeber reference and the present invention in that the present invention uses two independently verifiable deep-set barriers. It would not occur to me to replace the single barrier described in the Haeber reference with the dual packer system of Figure 2 of the Hess reference. Firstly, I would have no reason to use two barriers instead of one, because neither of these patents suggests to me that this should be done. Secondly, even if I decided to use two barriers instead of one, there is nothing in either patent to suggest to me that they should both be deep set. Thirdly, I would not chose the inflatable packer described in the Hess reference because there would be a greater risk of slippage or migration of an inflatable packer up the wellbore than there would be using the plug described in the Haeber reference. The fact that the two packers in the dual packer system are not independent of each other and fail together makes switching to the Hess system even less desirable. It is also not clear to me whether or not the deflated Hess packer can be retrieved through tubing after the completion has been run into the well.

15. I have read and understood the specification filed for US patent 7,063,157 ("the Bartlett reference"). I found this reference to be completely irrelevant to the present invention. Bartlett teaches that once the tubing hanger (48) is landed in the wellhead (20), the tubing hanger production bore (56) is sealed by a shallow

set wireline plug which is installed through the running string and the THRT (96). The wireline plug provides an additional barrier between the well bore and the environment until the christmas tree (22) is installed on the wellhead (20). Once the christmas tree (22) is installed, the shallow set wireline plug can be removed (column 4, lines 58 to 67). The wireline plug described in the Bartlett reference is not a "deep-set barrier". It would never occur to me to attempt to replace the wireline plug described in the Bartlett reference with one or more of the inflatable packers described in the Hess reference as an inflatable packer is not suited to placement in a tubing hanger production bore. Even if I did, the result is nothing like the present invention in that I would be using one deep set barrier and one shallow set barrier and still need to rely on the BOP to supplement well control.

16. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Paul A Kelley

Paul Anthony Kelley
SPE No. 1260520
Date: 30/3/07

Witness: BRENT LEVEY
SPE No. 2002683.
Date: 30/3/07.